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Precautionary Expertise for GM Crops (PEG)

National Workshop Report UK

Quality of Life and Management of Living Resources
Key Action 111-13: socio-economic studies of life sciences
Project n° QLRT-2001-00034

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1 Introduction

Although the precautionary principle has been widely accepted in Europe as a basis for decision making about Genetically Modified (GM) crops, there are many perspectives on its interpretation and how it should be implemented. The PEG project is analysing how current European practices compare with different accounts of the precautionary principle. It has been examining different people's accounts of precaution and their views on the procedures for regulating and managing GM crops, in seven EU member states¹.

Workshops with the potential end-users of our research findings are an integral part of the PEG project. Workshops have been carried out in each of the partner's countries. These scenario workshops offer a policy analysis tool that enables a more action orientated approach to policy research. They help bridge the gap between research and the policy process by involving people at an early stage of the project, and ensure that our research questions and findings are embedded in the policy process.

This report discusses the outcomes of the UK workshop, 'GM Futures? Scenarios for GM Crops', held on 5th February 2003 at the Royal Horticultural Halls, London. The workshop used three policy scenarios as a tool for considering the causes and consequences of commercialisation of GM crops. Rather than attempting to predict the future, by mapping different scenarios the workshop attempted to draw out dynamics and interactions which may not otherwise be obvious.

Workshop participants came from a range of backgrounds and were all involved in the policy process either directly as a member of a Government department or advisory committee, or through their position within their organisation. A key policy-relevant outcome was the way that the three policy scenarios - to go ahead with commercialisation, to postpone it further or to commercialise GM crops in a limited way - might all present the Government with equally complex and difficult consequences. Further, while limited commercialisation may appear to be an attractive policy option, the scenario map drawn by the participants indicated difficulties that would need to be handled in order for limited commercialisation to be regarded as a potential option.

2 Use of scenarios

Scenarios are used to describe possible futures. Since its original development by strategic planners after World War II (Alcamo, 2001), scenario planning has been used extensively by companies for considering their strategic visions and by researchers interested in modelling the causes and consequences of what may happen in the future (Van der Heijden, 1996). Scenario exercises have several purposes:

- they can make unspoken assumptions apparent
- they are a way of incorporating creativity into rational analysis

¹ The PEG project has research partners in Austria, Denmark, France, Germany, Spain and the Netherlands. The project is co-ordinated by the UK team. In the initial phase of the PEG project information was gathered from documents released by all the relevant policy actors. Preliminary interviews and telephone conversations were also conducted with a range of representatives from Government, farmers groups, environmental non-government organisations (NGOs), consumer organisations and industry. People were asked for their views on GM crops and the relevance of the precautionary principle and its use.

- they enable exploration of options for turning unrelated social, technological, economic, ecological and political information into a framework for decisions and judgements
- they can be used to anticipate and explore understandings of potential risks
- they are a way of exploring things that are not immediately obvious
- they can question the conventional wisdom
- they may uncover new strategic options
- they may generate emergent ideas from people's interactions
- they may enable people to learn from one another and develop or revise their understandings of the world.

This workshop used scenarios to link policy and research. It builds on experience gained from a previous workshop held in 1999 at the end of a study funded by the EU on risk regulation of GM crops (Carr *et al.*, 2000; also OUBPG, 2000). This workshop offered a policy analysis tool that provided:

- an immediate check on the likely response of stakeholders to the policy implications of research findings (or of each other's responses)
- a way of checking out any assumptions we, the researchers, may have made about other people's views
- a way of making sure our research is policy relevant and revealing aspects we may have neglected
- material for informing the later stages of our research on precaution.

Further, for such a controversial topic, it offered a way for different stakeholders to explore different policy scenarios in an open, imaginative and non-confrontational way, i.e. it provided a 'safe' environment in which people could air issues of concern.

It should be noted that scenario mapping is a way of exploring different futures, not predicting the future. As Berkhout and Hertin (2002) point out, rather than being an objective fact, the future is socially constructed and as such there will be a diversity of opinions about what it will look like. It therefore cannot be treated as being real but rather must be treated as a set of possible alternatives depending on a person's viewpoint. The aim within this workshop was to attempt to capture some of the complexity of views on the situation in the UK for GM crops and to consider potential dynamics and interactions that are not necessarily obvious and which may be important for decision making. Further, the activity was not designed to look for agreement on the scenarios or produce any kind of consensus view on a particular scenario.

3 Choice of scenarios

In the UK workshop we used decisions associated with commercialisation of GM crops as a way of discussing precaution. We used commercialisation rather than precaution as the focus for the workshop discussions for several reasons. First, commercialisation involves making practical policy decisions, and we are mainly interested in precaution as it relates to practice. Secondly, any decision about commercialisation inevitably involves some interpretation of precaution, however narrowly or broadly defined. Thirdly, the issue of commercialisation provided scope for a broad discussion, encompassing divergent views of the precautionary principle and its relevance.

During this workshop, participants were asked to use their respective expertise to explore different policy scenarios about GM crops. Rather than choose scenarios far

into the future, three scenarios were chosen which were considered plausible policy options for present decision makers:

1. Commercialisation is postponed further.
2. Limited commercialisation goes ahead.
3. Commercialisation goes ahead.

4 Details of the event

A letter of invitation to the workshop was sent to over 60 key stakeholders involved in the general debate about GM crops in the UK. They covered a broad range of expertise - farmers' groups, industry, Government officials and committee members, consumers groups, and NGOs. The event attracted 20 participants in addition to one of our European project partners and the members of the UK project team.

As a result of the recent initiation of a 'formal public debate' in the UK, the workshop was able to form part of current activities to engage people in discussions on GM crops. However, while this has had many advantages, such as creating significant interest by policymakers in our research on the PEG project, it also meant that key stakeholders were in demand for many different events at the time of our workshop. As a result some groups, particularly the NGOs, farmers and consumers, were not well represented. Representatives approached from these groups did, however, express a wish to be kept informed of the workshop outcomes and have been invited to comment on the draft workshop report and scenario maps.

The final participants attending the workshop are listed in Appendix 1. Many of those attending were from a scientific background. They were all involved in the policy process, either as officials in the Department of Environment, Food and Rural Affairs or as members of the Government's advisory bodies the Advisory Committee on Releases to the Environment (ACRE) and the Agriculture and Environment Biotechnology Commission (AEBC), or through their role in their organisation, for example as director or head.

The workshop was managed by a professional facilitator and it was agreed that no remarks from the discussions would be attributed to a particular individual. The agenda for the day may be found in Appendix 2. Following an introductory talk by Professor Phil Dale on the work of the AEBC, the researchers on the PEG project briefly summarised their findings so far, as described in the background document sent to participants in advance of the workshop (see Appendix 3) and represented in cartoon form in Appendix 4. The participants were then divided into three groups and asked to consider the possible causes and consequences of the three policy scenarios for GM crops.

The exercise used a carousel method that allowed each group to make contributions to all three scenarios. Groups were encouraged to consider as many causes and consequences as possible for each scenario and these were written on post-it notes. Each group then returned to their initial scenario and sorted the causes and consequences into themes before giving a short presentation briefly explaining these themes to the other groups.

Following lunch the groups were provided with a short talk and instructions (see Appendix 5) on how to create scenario maps by linking the material, gathered throughout the morning, into logical sequences. Each participant was able to present their viewpoint by adding a new sequence if their view was not consistent with those of the rest of the group. The final maps represented an amalgamation of the group's views, so that not all participants necessarily agree with all that appeared on the scenario map.

Once the maps were complete, each group gave a short presentation on their scenario to the other groups. The day was closed with reflections on the event by Professor Alan Gray, Chair of ACRE (see Appendix 6).

5 Observations from the scenario maps

After the event the researchers drew some policy-relevant initial observations from the scenario maps created at the workshop and the process of creating them (see Appendix 7 for the scenario maps). These observations were circulated to participants soon after the event to allow them an opportunity to comment before this report was written (see Appendix 8).

5.1 Scenario 1: Commercialisation is postponed further

Participants identified fewer causes of this scenario than consequences (see Figure 1a and 1b in Appendix 7). This is interesting, given the pressures that exist for partial (Scenario 2) or full commercialisation (Scenario 3). It may reflect the fact that postponement is increasingly the *status quo*, and it is often easier to maintain the *status quo* than to bring about change. Possible causes of further postponement of commercialisation were seen as the lack of agreement on co-existence rules, evidence of the creation of super-weeds, and problems with significant gene flow and health scares, leading to revisions to the risk assessments. Other possible widespread causes included the unpopularity of GM, changes in the confidence of US farmers in GM crops, and the constraints of EU thresholds for adventitious presence of GM material, resulting in a lack of political will and the collapse of the market for GM crops.

Participants identified a large number of diverse and often problematic consequences. General themes in the consequences related to trade, agro/environment, alternative agriculture, and regulation and its impact on public confidence, and industry and science. There was some disagreement, particularly on consequences for public trust. Some consequences were contradictory, that is, participants thought both were possible, for example, confidence in the regulatory system amongst members of the public could go up or down as a result of postponing commercialisation. The scenario was viewed as likely to have negative consequences for industry and science, as the UK would be denied the potential benefits of GM technology, and farmers would be unable to compete in international markets. Yet there was also the view that postponement of commercialisation could result in opportunities for the UK. For example, the UK could become an important supplier of GM-free commodities. If government was forced to re-direct agricultural funds from biotechnology to other options, then key domestic markets could be secured, thus reducing the impact on UK agriculture from cheaper, imported food. This might also promote new opportunities for conversion to organic farming, although this might lead to an oversupply of organic products. Overall the consequences of this scenario were viewed negatively by participants.

5.2 Scenario 2: Limited commercialisation goes ahead

The second scenario was more difficult for participants and there are fewer links in this scenario map as the group ran out of time (see Figure 2a and 2b in Appendix 7). Initially participants made little headway on the causes and consequences of this scenario because much time was spent on discussing what the term 'limited' meant in this context. The scenarios had been deliberately worded as simple one line statements to encourage participants to develop their own storylines for the scenarios through discussion. However, this group felt uncomfortable with the lack of a more

comprehensive explanation of what 'limited' commercialisation meant. Despite these difficulties, this scenario generated some of the most interesting observations.

Participants in this group divided their consequences up into sectors – for example, regulatory, commercial, farmer - but then became confused over how plausible causes might correspond to those sectors. Discussions over the meaning of 'limited' raised important issues. Participants had different ideas about what limits were plausible and how they might happen. There were discussions over what situation 'limited' was relevant to, for example, whether it meant anything less than all crops being commercialised. It was pointed out that 'limited' commercialisation already exists as GM grain is being used for animal feed and that even Scenario 3, 'Commercialisation goes ahead', would still have limits (for example, it would still be regulated). There were also discussions over how to structure the scenario map since it was felt many of the issues could be described as both a cause and a consequence. The difficulties that participants experienced suggest that even though at first sight Scenario 2 appears to be the likely political compromise, its outcomes or consequences are no less problematic than those of Scenarios 1 or 2.

In contrast to Scenario 1, a larger number of causes than consequences was identified. Potential causes of limited commercialisation included Government inability to take a decision; difficulties with legal liability or GM testing costs; no market for some products; problems with public acceptance; difficulties with co-existence for particular crops; changes in food policy; the commercial viability of particular crops.

The potential consequences of limited commercialisation were identified as: new research opportunities, further intensification of agriculture and improvements in UK trade as the increase in consumer choice provides a market, although limited commercialisation might also result in food companies sourcing from non-GM areas. However, farmers in GM areas might also lose the option of growing GM-free crops. The possibility was also identified of limited commercialisation allowing experience to be gained of the technology, enabling people to become more comfortable with it, although the opposite might also occur.

It was observed that limited commercialisation may be likely to occur because it is an attractive political compromise. It would provide an opportunity to accommodate all sides in the controversy. However, the discussion of consequences established that in practice this may leave almost all the existing problems unresolved whilst at the same time adding new ones. One person commented wryly that one consequence would be that environmental lawyers would benefit.

5.3 Scenario 3: Commercialisation goes ahead

This scenario generated fewer causes than Scenarios 1 or 2, and fewer causes than consequences (see Figure 3a and 3b in Appendix 7). Possible causes included the lack of identification of problems with GM technology; the satisfactory completion of risk assessment trials; positive results from the Farm Scale Evaluations, and public acceptance. However, public apathy and a lack of application of the precautionary principle were also noted as possible causes.

Among the consequences for this scenario, the main themes generated concerned the science base, trade, co-existence and farming practices, and enhanced biodiversity. Increased investment in the UK science base as a result of ambitions for the UK to be at the forefront of biotech development could improve the UK research base. However, commercialisation might bring the UK into conflict with the EU. Difficulties might occur as a result of gene-flow, leading to co-existence issues. Changes in farming practices could lead either to an increase or a decrease in agricultural intensification and agronomic problems for farmers. Commercialisation might lead to a more competitive agriculture with improved economic and environmental benefits. Improved consumer

choice might lead to improved and cheaper food products. However, it might also lead to higher demands for organic products, resulting in increased imports.

There was considerable disagreement on the consequences of this scenario. Critically, consequences could be determined by the success or failure of a small number of regulatory mechanisms e.g. segregation and labelling. However, views differed on what outcome would count as 'success' or 'failure'. For example, if gene flow resulted in contamination, this could be seen as a failure of the regulatory system even if threshold values were not breached.

Although there were a number of negative consequences to this scenario, the general response by the participants was more positive than that to Scenario 1, which is probably a reflection on the type of expertise, or worldview, of the majority of the participants.

6 Common issues

Several important general observations can be made from the scenario mapping exercise:

- There was much commonality of issues across the three scenarios. This was evident from the themes that participants identified. Common issues included: difficulties surrounding co-existence and public acceptance, effects on agricultural strategies and practices, and investment in research and development.
- Participants tended to classify causes and consequences of scenarios according to themes, e.g. regulatory issues, market issues, social issues. In some cases themes were used for convenience as it was not easy nor obvious how to classify clear causes or consequences. Such themes are useful, but during the mapping exercise they meant that in some cases chains of causality tended to be identified within (rather than across) themes. However, there was limited time in which to do the mapping exercise and given more time it is possible that further cross links would have been explored.
- Participants often offered causes and consequences that were informed by an idealised model of the situation or that represented ideal understandings of institutional capacity to control or manage practices. For example, that further postponement of commercialisation might force Government funds in the direction of agriculture and result in the development of agriculture in 'a more sound direction', was raised in Scenario 1. Another example, from Scenario 3, was the tendency to invoke perfect regulation. Regulations that operated perfectly made specific negative consequences of commercialisation, such as health risks, 'impossible'. Idealised representations of scientific research and economically rational businesses were also often invoked.
- The sometimes contradicting chains of causes and consequences within the scenarios probably reflect the uncertainties associated with GM, allowing contrasting interpretations or predictions based on people's different understandings.
- Many of the chains of consequences reflected the expertise or interests within the group. For example, Scenario 3 has a chain relating to investment in the UK science base which half-jokingly ends with the consequence 'I still have a job'. It also suggests that the under-representation at the workshop of certain types of expertise limited the diversity of ideas represented in the maps.

- Some consequences were viewed as more certain to occur than others, leading some participants to ask if consequences should be weighted according to their certainty. In other cases participants were unsure which of two contrasting possibilities might occur, for example, agricultural intensification or improvements in agricultural sustainability. Although the combined expertise of the participants was considerable, many consequences lay beyond consensual predictions.
- Some elements of the GM debate were striking by their absence from the scenario maps. For example, the debate about uncertainty was missing. Although the Farm Scale Evaluations were mentioned in Scenario map 3, there was little attention given to their role and what information is required from them before commercialisation is allowed to go ahead. The precautionary principle was only mentioned in Scenario 3 and was not actively discussed by the workshop participants. However, it is implicit in all the scenario maps. For example in Scenario 1, causes such as health scares and horizontal gene flow led to consequences such as revising the risk assessment and the postponement of commercialisation, and in Scenario 2, one line of causality suggests that limited commercialisation occurs for 'safer' products only.

7 Observations on the process

Despite the limited amount of time available for the scenario exercise, a rich variety of causes and consequences were identified and mapped. Most of the participants knew each other and immediately felt reasonably comfortable with the tasks set for them and worked well together. However, each group functioned differently. For example, one group discussed the causes and consequences and appointed a scribe to write them down, whereas in the other groups, individuals or sub-groups wrote their own phrases. The causes and consequences could not therefore be read as a group or consensus view.

The exercise was designed to enable people to express their views. However, there was a tendency for participants to become stuck in arguments over the consequences of a particular scenario. In some cases the process of scenario building was slowed down by participants attempting to correct the 'misconceptions' of another group member. Some members of the groups were more dominant than others and there were cases of participants policing the ideas. This mirrors the way processes (or institutions) can become blind to possible/plausible causes or outcomes of decisions. Nevertheless, despite this, differences of opinion were generally accommodated through the generation of a new line of causes within the scenario.

The main type of scenario that the groups were allocated may have influenced how the group functioned. For example, the scenario 'commercialisation is further postponed' may have been easier to consider because it involved a continuation of the present situation. The causes were therefore taken for granted, although the consequences provoked much discussion.

The discussions around the scenarios were as important as the map building exercise itself. The interactions were successful in raising many important issues of common concern as well as points of disagreement. Although Scenario 2 was considered by the participants to be difficult to interpret, the discussions generated by trying to resolve this difficulty were important in raising issues that may occur for this scenario in practice. For example, how limited might limited commercialisation actually be and how difficult might such limits make its implementation.

In the final discussion, as already mentioned, the question was raised of giving more weight to particular views according to the evidence available to support those views. For example, since there is wide scientific agreement that gene flow will occur, this view

could carry more weight. Although there are tools and approaches that can be used to follow on with an activity that weights variables in this way, there was not time within the workshop to do this.

The issue of the validity of the scenario exercise was also raised in the final discussion as participants were concerned there was no way of testing the statements. However, it was noted by another participant that although scenarios may be plausible they are not designed to be verifiable. They are an attempt to capture some of the potential future issues. While some participants felt concerned over the open-ended character of the exercise another commented that this was a strength of the exercise. As there is no clarity on many of the issues, the nature of the exercise allows many voices to be heard rather than assuming that scientists speak with one voice. Another participant remarked that future uncertain consequences must be taken into account by government policy and that the exercise throws up a host of issues people are concerned about and which the government has to take on board. Another commented that the diagrams may also be useful for identifying potential interventions and practices relevant to a participant's situation.

8 Conclusion

The workshop provided policy relevant insights into decision making for GM crops. Analysis of the UK report in relation to the reports from the workshops held in the PEG projects partner countries is likely to provide further insights. Important issues arose from the group discussions, particularly for Scenario 2 where there was discussion over what 'limited commercialisation' might mean in practice. The scenario maps generated by the workshop are not an attempt to predict the future and can only indicate what the causes and consequences of a particular decision might be. However, the large number of consequences generated for each scenario indicate that, like many environmental issues, there are complex and interacting consequences involved in any decision for GM crops. They indicate the difficulties with making any decision on commercialisation work. The scenario maps highlight the potential for particular chains of events to occur, although they also draw attention to the way people have a tendency to evoke idealised situations when considering GM futures. The maps indicate that no one of the three scenarios - Commercialisation is postponed further, Limited commercialisation goes ahead or Commercialisation goes ahead - is without difficulties. Each scenario is likely to present its own series of future problems. For example, the scenario map for the compromise scenario, Scenario 2, indicates the particular difficulties that this scenario may present for any decision on GM crops, and that it may therefore potentially be no more likely to resolve the GM debate than either of the other scenarios. As with the other scenarios, this scenario presents both difficulties and opportunities, for example, the limited introduction of GM crops offers opportunities for advancing learning about any potential wider impacts of this new technology.

Valuable insights and experience were gained from this workshop. Together with experience gained from the parallel workshops held by project partners in other EU countries, observations from this workshop are being used to inform the design of an EU-level workshop in Brussels and inform the overall findings of the PEG project.

Acknowledgements

We should like to thank all the workshop participants for their invaluable contributions to this workshop and for their subsequent comments on the report. We should also like to thank Mark Yoxon for his excellent facilitation of the event.

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Appendix 1: List of participants

Ms Gundula Azeez	Soil Association
Ms Tracey Brown	Sense about Science
Dr David Carmichael	AEBC
Mr Ian Coates	Prime Minister's Strategy Unit
Prof. Phil Dale	Biosafety Research Group, John Innes Centre
Dr Ed Dart	Plant Bio-Science
Prof. Alan Gray	Centre for Ecology and Hydrology
Dr Rosie Hails	NERC Centre for Ecology
Dr Susan Hartley	ACRE
Dr Penny Hirsch	ACRE
Prof. Vivian Moses	CropGen
Mr Daniel Pearsall	SCIMAC
Prof. C Pollock	ACRE/Institute of Grassland Research
Dr Paul Rylott	Bayer Crop Science
Dr Linda Smith	DEFRA
Prof. Spash	Macauley Institute
Dr Andy Sterling	SPRU
Dr J Stoye	ACRE
Dr Jeremy Sweet	NIAB
Mr Renaud Wilson	DEFRA
Prof. Joyce Tait	SUPRA, University of Edinburgh
Dr Sue Oreszczyn	The Open University
Prof. David Wield	The Open University
Dr Susan Carr	The Open University
Dr Les Levidow	The Open University
Dr Joseph Murphy	The Open University
Karin Boschert	Ludwig-Maximilians-University, Munchen
Mark Yoxon	INFORM (Facilitator)

Appendix 2: Workshop agenda

‘GM FUTURES? Scenarios for GM Crops in the UK’

5th February 2003, 10:00 – 17:00

Royal Horticultural Halls, London

Agenda

Time	Item	Who
10.00	Coffee & registration To include “Post it” note exercise on key issues	
10.30	Welcome and introduction to the day	Dave Wield
10.40	Opening talk	Phil Dale
11.00	Presentation of key points from UK Study	Sue Oreszczyn
11.15	Examining the 3 Policy Scenarios – Groupwork “Carousel” activity to explore the key issues around each of the 3 policy scenarios	Mark Yoxon
12.30	Reporting back Concise summary presentations from each group	All
12.50	Close and brief insight into the afternoon session	Mark Yoxon
13.00	Lunch	
14.00	Scenario mapping Brief presentation on scenario mapping	Sue Carr
14.10	Issues into Actions – Introduction Drafting maps for each policy scenario	Mark Yoxon
14.15	Working Groups 3 working groups, each with an OU facilitator – task is to draft a scenario map	All
15.15	Reporting back Concise summary presentations from each group	All
15.45	Break	
16.10	Reflections on the day	Alan Gray
16.40	Close Followed by an informal drinks reception	Dave Wield

The policy scenarios are as follows:

- Commercialisation is postponed further.
- Limited commercialisation goes ahead.
- Commercialisation goes ahead.

Appendix 3: Background document sent to the participants

Precautionary Expertise for GM Crops (PEG)
EC Research Programme: Quality of Life and Management of Living Resources
Project QLRT-2001-00034

Background Information for the UK Workshop: 'GM FUTURES? Scenarios for GM Crops in the UK'

**Royal Horticultural Halls, London
5 February 2003**

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1 Introduction

Although the precautionary principle has been widely accepted in Europe as a basis for decision making about GM crops, there are many perspectives on its interpretation and how it should be implemented. The PEG project is analysing how current European practices compare with different accounts of the precautionary principle. It has been examining different people's accounts of precaution and their views on the procedures for regulating and managing GM crops, in seven EU member states².

Workshops with the potential end-users of our research findings are an integral part of the PEG project. The purpose of the workshops is to involve people at an early stage of the project, to help ensure that the research questions and findings are policy relevant. Each research partner will be holding a similar national workshop in their own country, and the outcomes will inform an EU-level workshop, to be held in Brussels later this year.

In the UK workshop we shall use decisions associated with commercialisation as a way of discussing precaution. We have used commercialisation rather than precaution as the focus for the workshop discussions for several reasons. First, commercialisation

² The PEG project has research partners in Austria, Denmark, France, Germany, Spain, and the Netherlands. The project is co-ordinated by the UK team. In the initial phase of the PEG project information was gathered from documents released by all the relevant policy actors. Preliminary interviews and telephone conversations were also conducted with a range of representatives from Government, farmers groups, environmental non-government organisations (NGOs), consumer organisations and industry. People were asked for their views on GM crops and the relevance of the precautionary principle and its use.

involves making practical policy decisions, and we are mainly interested in precaution as it relates to practice. Secondly, any decision about commercialisation inevitably involves some interpretation of precaution, however narrowly or broadly defined. Thirdly, the issue of commercialisation provides scope for a broad discussion, encompassing divergent views of the precautionary principle and its relevance.

The purpose of this document is to inform the discussion of scenarios at the UK workshop, by summarising the results of our research so far. In particular, it focuses on the current issues relating to the commercialisation of GM crops in the UK, the different understandings of precaution, and communication and inclusion.

2 Current issues relating to the commercialisation of GM crops

Accounts of precaution and precautionary practices for GM crops in the UK are operating within the current debate concerning potential commercialisation of herbicide tolerant crops. Some of the main issues currently being debated or mentioned in interviews are summarised briefly below.

Managed development

In October 1998 the UK Government, with the co-operation of industry, announced a delay in the commercialisation of approved GM crops, proposing instead a 'managed' development. The Government's view was that biotechnology was a way of increasing agricultural efficiency and attracting investment to create a more competitive industry. While industry are convinced of the safety and benefits of GM crops, many people remained concerned about the potential dangers particularly to the environment. A major obstacle to commercialisation in the UK has proved to be the controversy over the impact broad-spectrum herbicides may have on wildlife habitats. Concern has been particularly acute as 69% of the land in the UK is registered as agricultural holdings (Countryside Agency, 2002) and there are few remaining 'wild' areas.

In response to these concerns, Government has established the Farm Scale Evaluation (FSE) research programme. Industry has agreed to delay commercialisation of approved crop varieties while large scale farm evaluations are conducted. Nevertheless, as a precautionary measure the Farm Scale Evaluations have been controversial. Rather than settle matters they have intensified debate by providing a focus for peoples concerns.

Expanding expertise

The emphasis on scientific knowledge as a basis for GM decisions is being challenged by the AEBC and NGOs. Their concerns have led to an increasing openness in expert judgements, and greater input into the decision making process by a wider range of stakeholders. In 1999 the Advisory Committee on Releases to the Environment (ACRE) was broadened to include more agro-ecological expertise and members with direct links with the biotechnology industry were removed.

At about the same time (mid. 2000), the Government set up the Agriculture and Environment Biotechnology Commission (AEBC), to complement the scientific advice provided by ACRE. The AEBC advises on the broader and longer-term strategic issues surrounding agricultural biotechnology. It draws Government's attention to people's concerns and has highlighted the limitations of a narrow scientific risk assessment. In its report *Crops on Trial* (AEBC, September 2001), the AEBC proposed a more participatory approach and raised concerns, such as the scientific limitations of the FSEs, the adequacy of the risk assessment procedures, the question of separation

distances, and the need to protect the interests of organic farmers. They also noted that wider philosophical and ethical concerns, such as those about the manipulation of nature, are not being adequately addressed, and that the FSEs would not be sufficient alone to reach a decision about commercialisation.

The establishment of the AEBC is widely regarded as an acknowledgement of the need for a broader framework that allows for legitimate factors other than science to be considered. It has sought ways for such concerns to be more formally elicited, analysed and documented. It has also allowed criticism of current structures to be given a higher profile in the political arena. Industry representatives, however, point out that the role of the AEBC in an evidence-based approval system remains unclear (House of Commons 2002, Annex).

Although the Government is attempting to broaden expertise beyond official bodies, stakeholders remain critical of the way that expertise is still being limited. For example, ACRE are criticised for lacking a public interest group representative or a lay person (Five Year Freeze, 2001) and their limited remit has been commented on by the NFU. Their lack of a Welsh representative has been pointed out by Friends of the Earth Wales and by the Welsh Agri-Food Partnership's Organic Strategy Group. The quality of expertise for examining uncertainties is also under criticism, for example, the adequacy of the scientific evidence and the scientific abilities of ACRE have been questioned over approvals for T25 maize. Further, critics argue that advisory panels should formally take account of the wider farming and environmental implications when granting consents to market products, for example, whether the use of herbicide tolerant plants is a good strategy for weed control in the long term, both environmentally and agronomically.

Co-existence

A major concern highlighted by public responses to the FSEs is about the co-existence of GM and non-GM agriculture. This is particularly acute in regions where organic and less intensive agriculture are important components of the local economy, such as Wales and the western areas of England and Scotland.

The Welsh National Assembly (WNA) has set its own policy on precaution regarding GM crops and co-existence. It is applying the most restrictive approach possible within the EU legislation. Agriculture in Wales consists of predominantly small farms, and so there is concern over the potential for cross-pollination of neighbouring crops. This is related to the increasing area of organic production in Wales and farms involved in agri-environment schemes. The WNA put the issue of co-existence firmly on the EU agenda when they used powers devolved to them under the UK's Environmental Protection Act to impose legally enforceable separation distances. The Assembly argued that "a broad interpretation of Article 16 allows 'protection of the environment' under the directive to include protection of an environment where organically pure crops can be grown." (Annex to Aventis prohibition notice.) An Article 16 notification was triggered by the UK Government under the EU's Deliberate Release Directive. The Government argued on behalf of the Welsh Assembly that the T25 maize would involve a "risk to the environment" and that the Part C consent granted had not addressed the issue of safeguards for neighbouring GM crops (letter from the UK Permanent Representation to the EU, 13.7.01).

In Devon, local councillors have considered declaring the county GM free (Phelvin, 2003). While in Scotland, local people and NGOs have called for Scotland to be declared GM free. There has been strong local opposition to the GM crops planted for the Farm Scale Evaluations. Scottish Natural Heritage have particularly expressed their concern over the impacts on the wider countryside and the rural economy and the need

to ensure that monitoring is not used as a substitute for risk assessment (Williamson, 2001).

Thus there is a tension between the national and local positions on GM crops, which has highlighted the conflicting views of the organisations representing the diverse farming community within the UK. It has also emphasised the way that the risk assessment process makes narrow assumptions about socio-economic concerns.

Desirable agricultural futures

Issues surrounding co-existence have highlighted the need for GM crops to be incorporated into wider debates over desirable agricultural futures, implying a more holistic approach to agriculture than is currently being applied.

A common concern expressed by interviewees for this project is the potential for GM crops to increase agricultural intensification. The use of GM crops could lead to an accelerating loss of biodiversity and be in conflict with the UK Biodiversity Action Plans. Intensification could result from the varieties used or from management practices, for example, a further increase in the area of winter sown crops could reduce plant diversity and the species dependent on it. However, this is not perceived simply as a GM issue. As one interviewee commented, "it depends on how we use GM crops and there is good evidence that conventional crops affect biodiversity".

Therefore, for many people, uncertainties over potential changes in farm management and the effects on biodiversity, and the concerns about gene flow and gene stacking, suggest there is a need to consider GM plants as crops in a wider context rather than as an isolated technology. They call for discussions to be set within a wider debate about the kind of agriculture society wants.

3 Understandings of Precaution

Different interpretations of precaution were evident in the accounts people gave of the issues surrounding GM crops and commercialisation. These understandings of precaution offer a way of framing the issues described in the previous section.

Some people are concerned that the precautionary principle could be used for ulterior motives; for example, industry groups are concerned over the potential for precaution to stifle innovation or to be used as a tactic for delaying commercialisation, others view it as an opportunity for greater fairness, openness and inclusiveness. In its report *Crops on Trial* (September, 2001) the AEBC comments that a precautionary approach should be holistic, protecting those affected by an activity rather than those who benefit, acknowledging the complexity of the real world and recognising the vulnerability of the natural environment. At the other end of the spectrum, the Soil Association, while taking precaution seriously, comment that GM and non-GM are simply incompatible, therefore precaution becomes irrelevant. The main themes to emerge from the initial interviews are shown in Table 1. They represent elements of peoples thinking, therefore, a persons understanding of precaution may comprise of more than one theme.

Table 1: Emerging themes on precaution and GM crops in the UK

	Examples
<i>Precaution as proceeding with care</i>	Precaution is something people do anyway, that they exercise all the time. Industry does it already with new products. Precaution is about "proceed with great care" – the precautionary principle is exercised all the time in areas where there is incomplete knowledge.
<i>Precaution as good science</i>	It is a necessary part of good scientific practice.
<i>Precaution as a rational approach/framework for decision making</i>	Implementing the precautionary principle should not be based on emotions. Some stakeholders are particularly keen that a greater following for the EC's communication on the precautionary principle will lead to a more rational approach to decision making. Arguments against irrational precaution refer to the way nothing has happened yet– no detrimental health effects, no contamination of organic agriculture during field trials.
<i>Precaution as a means for greater openness</i>	Transparency is particularly important for NGOs and farmer groups. For example, calls for results of any monitoring programmes to be in public domain. The AEBC is a good example of attempts at openness in government committees.
<i>Precaution as a mechanism for placing policy decisions within a societal context</i>	We should question the need for the technology in the first place. It should also mean the inclusion of an evaluation of all possible options. Precaution should involve widening decisions beyond a narrow scientific base.
<i>Precaution as a pretext</i>	The public debate will be indecisive, Government will use it to back their decision either way.
<i>Precaution as inclusive</i>	Precaution means including more views. The public debate is viewed as playing an important role in opening up the debate.
<i>Precaution as fair</i>	The costs and benefits of GM technologies are not necessarily evenly distributed. NGOs call for consideration of this in the assessment process.
<i>Precaution as a means for stifling innovation</i>	Concern that the precautionary principle will be used to prevent technological developments. Commercialisation of GM crops will go ahead, it is just a question of time. The precautionary principle should not be invoked to slow development down.
<i>Precaution as a delaying tactic</i>	Precaution is viewed as slowing things up, to delay the decision-making process for as long as possible. Given time the public will change their views and this will be reflected in Government decisions.
<i>Precaution as an iterative and flexible process</i>	Moving with the situations as they change, as the technology develops. Precautionary measures need to be flexible, they need to be appropriate to the different products and contexts.
<i>Precaution as a reputation enhancer/as demonstrating responsibility</i>	Business may utilise precaution to demonstrate their ability to be responsible. There is a growing realisation that it is an essential element in the corporate environment. Growing concern over the way that NGOs/media conduct themselves in GM debates – calls for greater responsibility.
<i>Precaution as a long term view</i>	Provides an opportunity to consider the future – should be a long term rather than a short term view.
<i>Precaution as irrelevant</i>	No commercialisation of GM crops means there is no need for precaution.

There has been no common view or consistent approach to the precautionary principle, in general, in the UK. With respect to the EC communication on the precautionary principle (EC, 2000), those questioned were aware of the document, which was considered useful or a step in the right direction, but they had not necessarily referred to it recently or did not necessarily know its content in detail. Government and some

organisations, such as the Consumer's Association (see, Consumer's Association, 2002), the Crop Protection Association and English Nature, have been developing their own interpretations of the precautionary principle, some based on the EC Communication, translating them into practical guidelines for dealing with uncertainties in their own particular field. For other organisations, the precautionary principle is not necessarily articulated as such, but is more an underlying feature of their perspectives. They rarely use the word uncertainty in the narrow way it is used in the EU document and consider precaution as more a general way of acting rather than something to be triggered.

The different themes on GM crops suggest that precaution and the precautionary principle are considered by people in at least two different ways: as a precise 'toolkit' i.e. a set of steps to follow, and as a mindset, i.e. an underlying or implicit aspect of a person's perspective. This difference has also been noted by Willis and Oldham(2002) who considered the precautionary principle in general. A tension therefore exists between the need for more formal approaches to precaution with a clear procedure, as set out in the EC Communication (EC, 2000), and a more open process. That is, between something which is triggered and something which is a more general way of acting.

Thus, for GM crops in the UK, precaution has tended to operate as a process rather than a formal set procedure. There are a range of views all providing valuable input into the negotiation over the path that society should take. It is an ongoing process, drawing in more expertise, both strategically and unintentionally, and creating new institutional practices and alliances.

4 Communication and inclusion

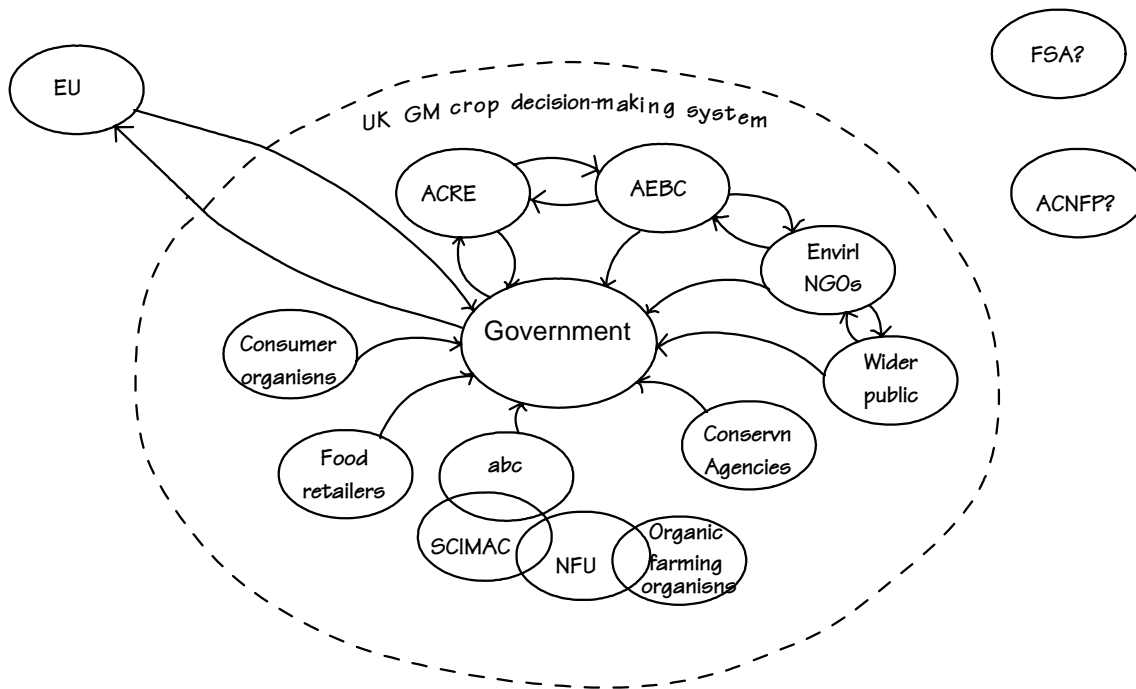
NGOs remain critical of 'expert' led, top-down approaches to risk management and the lack of recognition of broader societal concerns. 'Experts' making decisions are viewed as being insulated from the risks and are criticised for not taking communication seriously. For example, the National Consumer Council (2002) comments "traditional risk communication typically sees the process as an add-on at the end of the risk management process", exemplified by Government's attitude of "we make the decision and then we tell you what the decision is". They are critical of what they see as the 'one way dialogue'.

Communication is thus an important ongoing process for precaution and it is increasingly being promoted by all stakeholders. Industry is forming alliances, for example the Agriculture Biotechnology Council (abc) (see abc 2002), and so are NGOs. Opportunities are arising for industry and NGO's to come together and communicate on issues of concern, for example at workshops and seminars (see Willis & Oldham, 2002 and Environment Council, 2001). There is now greater communication between Government committees and between those committees, NGOs and the wider public.

The broadening of expertise and inclusion of a diversity of views is an on-going process. The expertise changes as members of bodies such as the Advisory Committee on Releases to the Environment (ACRE) and the AEBC change, as their sub-groups focus on new issues and draft in or take evidence from additional expertise, and as they interact with one another. The establishment of the AEBC as a new structure has led to the establishment of further formal structures to engage with the wider public. They have also suggested that a "network of social researchers" be set up to consider public responses to new technology which would produce a continuous body of "improved social intelligence" for use in Government decision making (AEBC September, 2001). The official 'public debate' (see the following section), through which

the Government has encouraged participation by organisations as well as the general public, will further draw in an increasing diversity of views and generate further understandings and actions. The interactions among the different stakeholders (Figure 1) promote opportunities for policy learning.

Figure 1: Institutional Influence Diagram in relation to UK GM crop decisions – January 2003



The Official Public Debate

Public debate over GM crops has been gradually intensifying and is set to intensify further as the results of Farm Scale Evaluations (or GM maize, oilseed rape and sugar beet) become available. Through a process of an official 'public debate' the Government aims to restore people's confidence in science as a basis for policy making. "The intention is to create a dialogue between all strands of opinion on GM issues" (Government response to AEBC, April 2002). The official 'public debate' represents a step forward in engaging with people's concerns. It has the potential to link expert judgements with broader public concerns and is an opportunity for developing mutual learning. However, the process is not without criticism. Academic advisors have also questioned assumptions underlying the Government funded public debate, such as the capacity of science to resolve uncertainties and accommodate public concerns (Burgess et al., 2002).

5 Concluding remarks

The decision-making system for GM crops is complex. It remains unclear how and to what extent the various elements - the formal 'public debate', further research, and the results of the FSEs - will link into policy making and the decision on commercialisation of GM crops. Questions remain, for example, over how much research would be considered enough for such a decision. For the Government it is seen as a way "to

identify the questions which the public has and provide information in response” (Meacher, Hansard, 15 July 2002) and for industry as a means for educating people. Nevertheless, it represents a more formal approach to broadening expertise to include the wider public in an “overall programme of dialogue”, and an opportunity for embracing complexity through the inclusion of many perspectives.

The Government has shifted its position and gradually accepted that a decision on commercialisation will not be as easy as originally thought. Government structures are increasingly opening up, both intentionally and unintentionally, to wider expertise. However, there is a tension between the constraints at the European level and the process of opening up at the national level. The EU regulations still disregard socio-economic aspects of concern for many stakeholders. Further, concern over the co-existence of different types of agriculture in different regions highlights the need for national and European structures that adequately address the needs of local areas.

The policy to broaden regulatory expertise has set in motion a process of inclusion of expertise beyond Government expectations and control. It is a process that may complicate the stated Government claim of restoring public confidence in science. For many people, restoring trust in the decision making process means not just encompassing more perspectives but also being open to different outcomes. It means going beyond the ‘expert’ led, top-down, science based model, towards a more inclusive and holistic precautionary process.

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Appendix 4: Picture representing key UK issues for GM crops

Picture representing the key UK issues for GM crops. Used in the workshop presentation.



Appendix 5: Information sheet on how to draw the scenario maps

Scenarios – causes and consequences

Constructing a multiple cause and consequence diagram

The aim of the exercise:

to sort the causes and consequences into logical sequences

Subsidiary aims:

- to identify gaps in the sequence
- to think about possible interactions between consequences, and possible unintended consequences
- to consider how various actors might respond, leading to further consequences
- to stimulate further ideas/insights about consequences

Steps:

For the purposes of this exercise, the group who initiated the discussion of a particular scenario takes responsibility for constructing the diagram for that scenario.

Each group needs to appoint one person to act as co-coordinator/facilitator and another as rapporteur. The group needs to gather around a table where all the post-its can be displayed.

1. Place post-it with the scenario in the middle of a large sheet of paper on the table.
2. Place the causes of the scenario above the scenario post-it, and the consequences below the scenario post-it.
3. Organise the causes in sequence, so that one leads to the next, which leads to the next and so on until the one that leads to the scenario.
4. Do the same for the consequences, leading from the scenario.

Note that there is likely to be more than one chain of causes and consequences. Feel free to create as many chains as necessary.

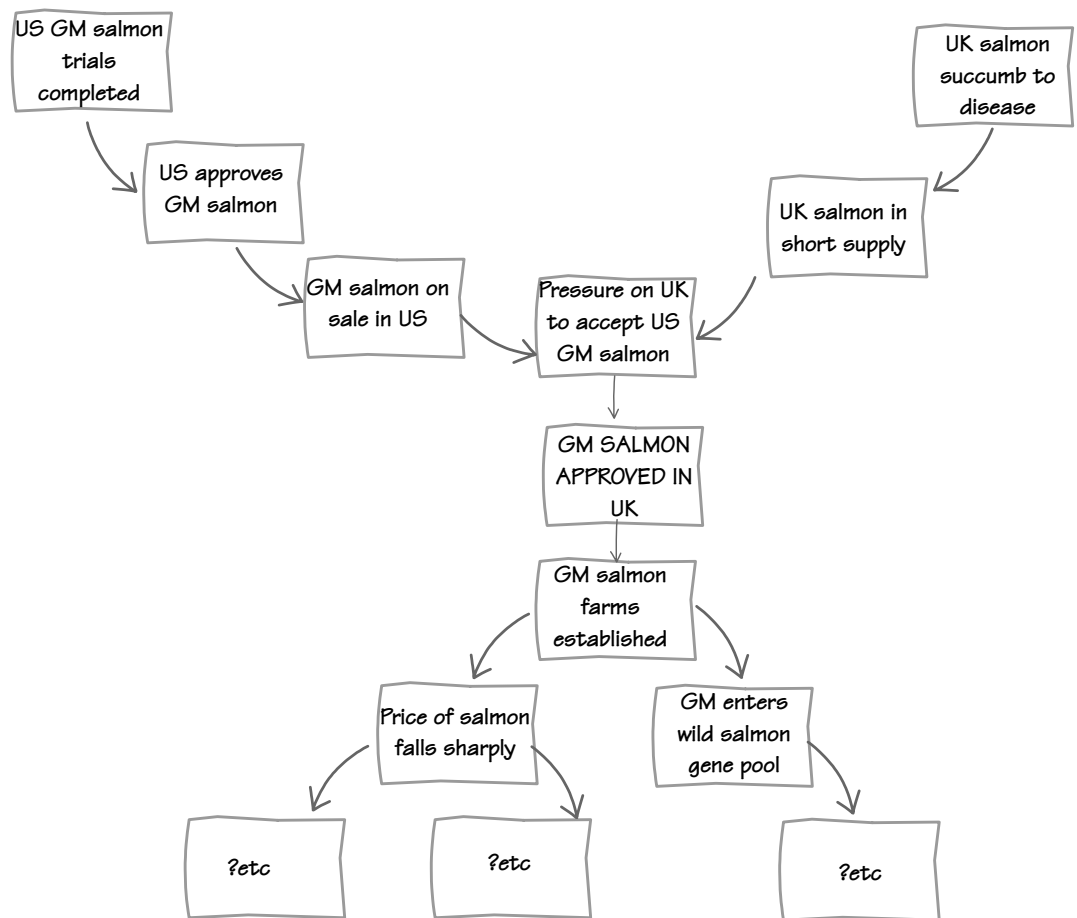
- 5 Draw arrows from each cause and consequence to the next in the sequence (the arrow signifies 'could lead to...' 'might cause...', 'might affect...' 'might contribute to...'.)
6. Check through each chain to see if it makes sense. Clarify meaning if necessary. If there seems to be a missing link, write a new post-it that fills the link.

If you disagree with the group's ordering, add your own order to the diagram (using copies of the post-its) or, if you prefer, construct your own diagram on a separate sheet of paper.

See example overleaf.

7. Pause to consider if other arrows should be added (e.g. links between different chains of consequences, or links backwards to an earlier consequence or cause). This may involve re-arranging the diagram to make these links clearer.
8. Pause to consider if any new causes or consequences occur to you as a result of the diagram – e.g. how might different actors respond to each link in the chain?

Example: Diagram of possible causes and consequences of GM salmon being approved in the UK



Appendix 6: Reflections on the day by Alan Gray, Chair of ACRE

Thank you for the invitation to offer reflections on the day. I have five main points:

1. These scenarios lie outside my field. But there was a commonality of issues across the three scenarios, regardless of what is done – (except for the effects on world trade in the commercialisation scenario).
2. A cascade of things happen once a decision is made. There may be unavoidable and irreversible consequences, with no going back.
3. Our anticipation of such consequences influences what is done at the top of the scenarios, i.e. causes.
4. The debate about uncertainty was missing, e.g. about FSEs and their role. What do you need to know before you go ahead? How far must we deal with uncertainty before permitting releases?
5. GM crops have a platonic aspect, i.e. generic issues spanning the sector. But the consequences of commercialisation depend on the specific crop and the construct. I could have engaged better with specific cases, e.g. herbicide-tolerance.

Social scientists argue that science is inseparable from values and I agree the science has an enormous and important social context. As an advisory committee, however, we depend upon an empirical core of consensual scientific views. If another expert group were presented with the same evidence, then we must assume that they should reach a similar conclusion. Science has been built on this basis.

GM did not begin in 1999. To the bystander it must seem like science is always playing catch-up. For example, people say 'You didn't think about the Monarch butterfly'. But we did. How we explain the detail, beyond the sound-bite level, is a great challenge. For example, antibiotic resistance is widely seen as a general problem, e.g. of the transgene transferring to pathogenic organisms. But ACRE have looked carefully at specific cases and concluded, for example, that spectinomycin/streptomycin markers would not be a good idea. People seem unaware that after 2004, antibiotic-resistance genes will not be allowed under the EC Directive. How do we explain this detail and still engage the public?

People complain that science says, 'On the one hand ... and on the other hand.' Certainly sloganising may be more effective to get public attention than dealing with the detail. How do we get beyond sloganising? How should we deal with uncertainty?

There's a core of testable science that is agreed. Most scientific conclusions by advisory committees are verifiable. But arguments about evidence, which are usually conducted through obscure journals, are now being thrashed out in very public arenas.

People often say, 'But you don't know enough about it', and therefore that you should apply the precautionary principle by delaying judgements about safety. It is difficult to refute such an assertion – the nature of science is that we will never know everything, nothing is without uncertainty, or indeed possible risks. For absolute certainties you must look elsewhere. Scientific advice must be evidence-based and rational.

Appendix 7: Scenario maps

Figure 1a: Scenario 1 Commercialisation is postponed further (causes)

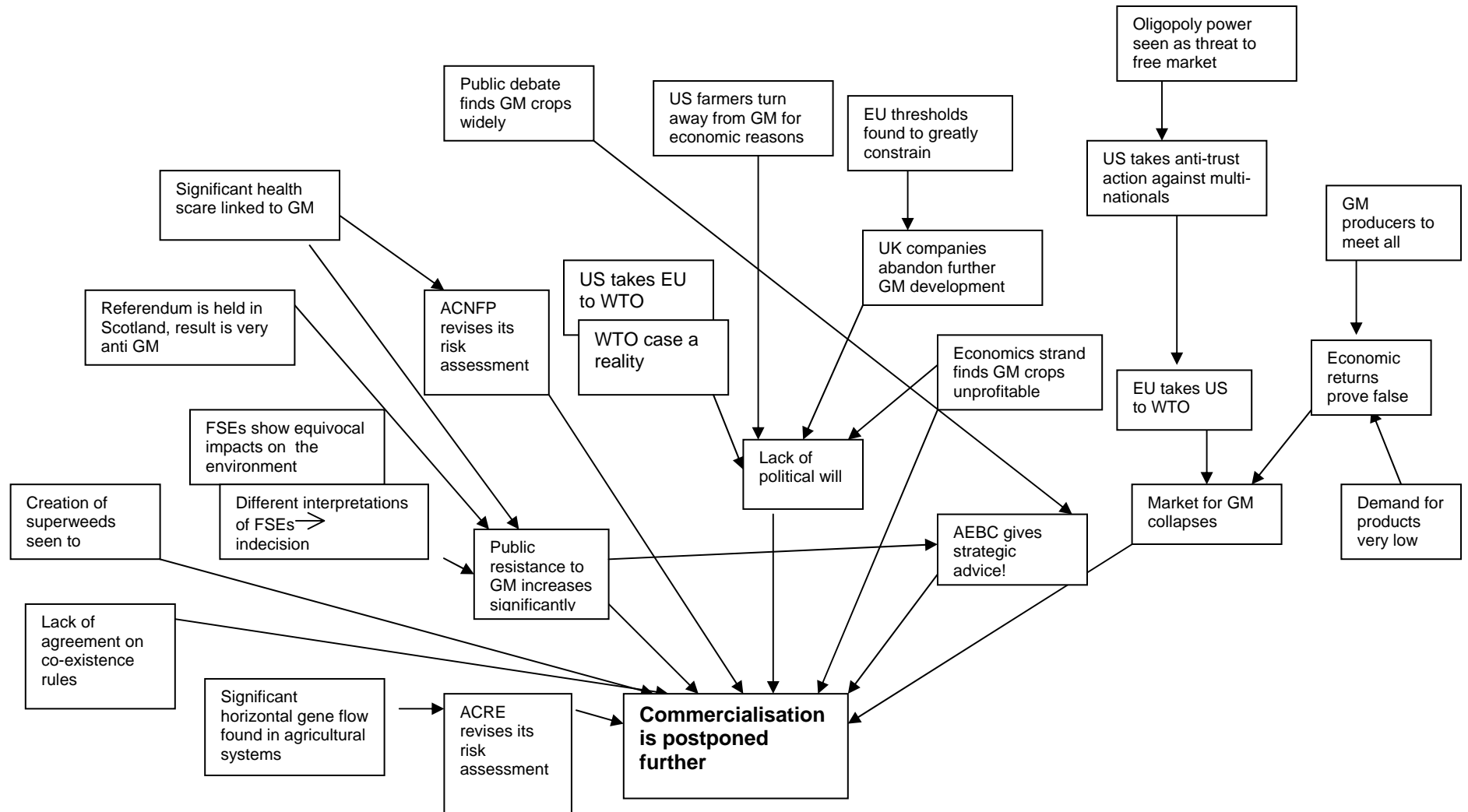


Figure 1b: Scenario 1 (consequences)

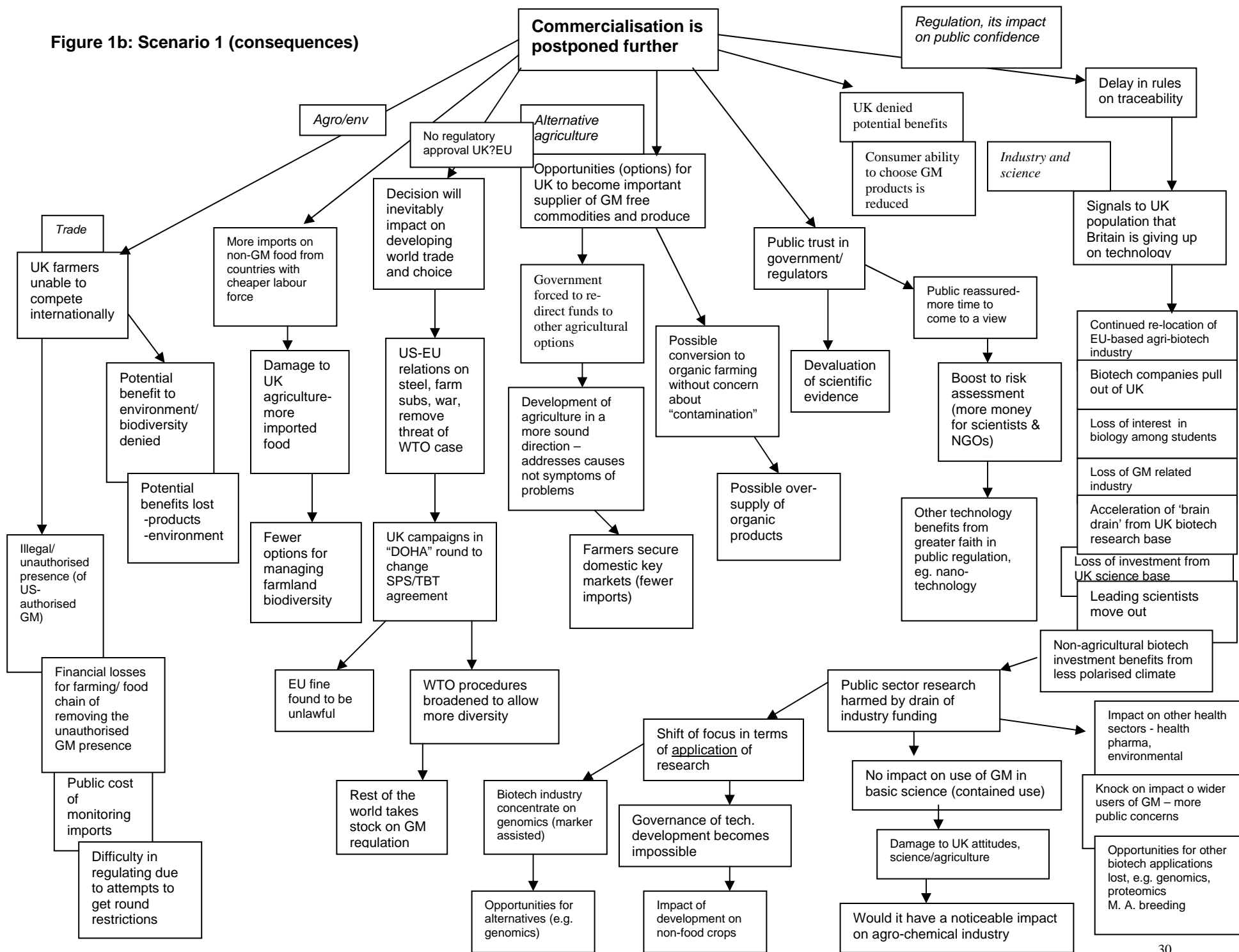


Figure 2a: Scenario 2 Limited commercialisation goes ahead (causes)

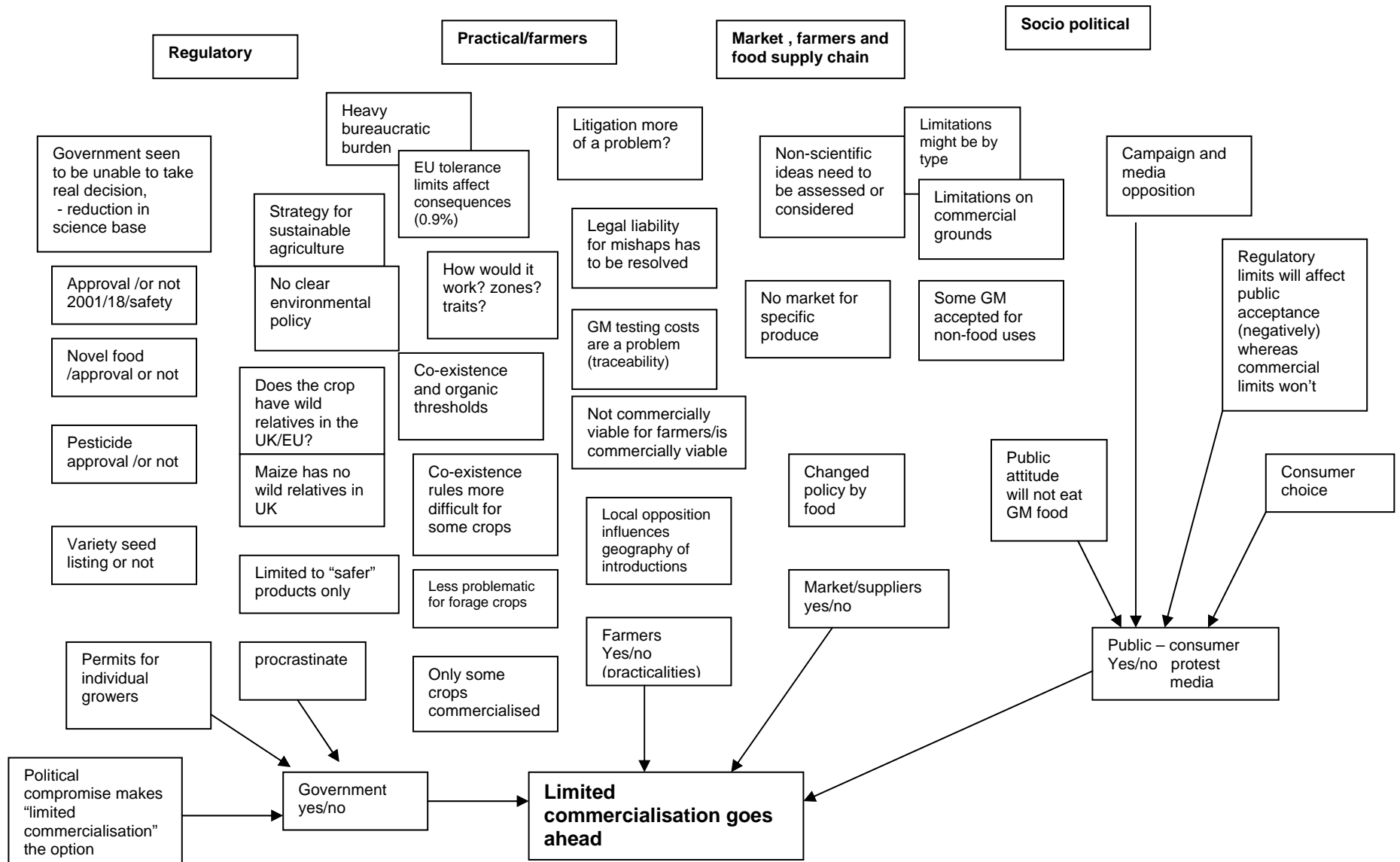


Figure 2b: Scenario 2 (consequences)

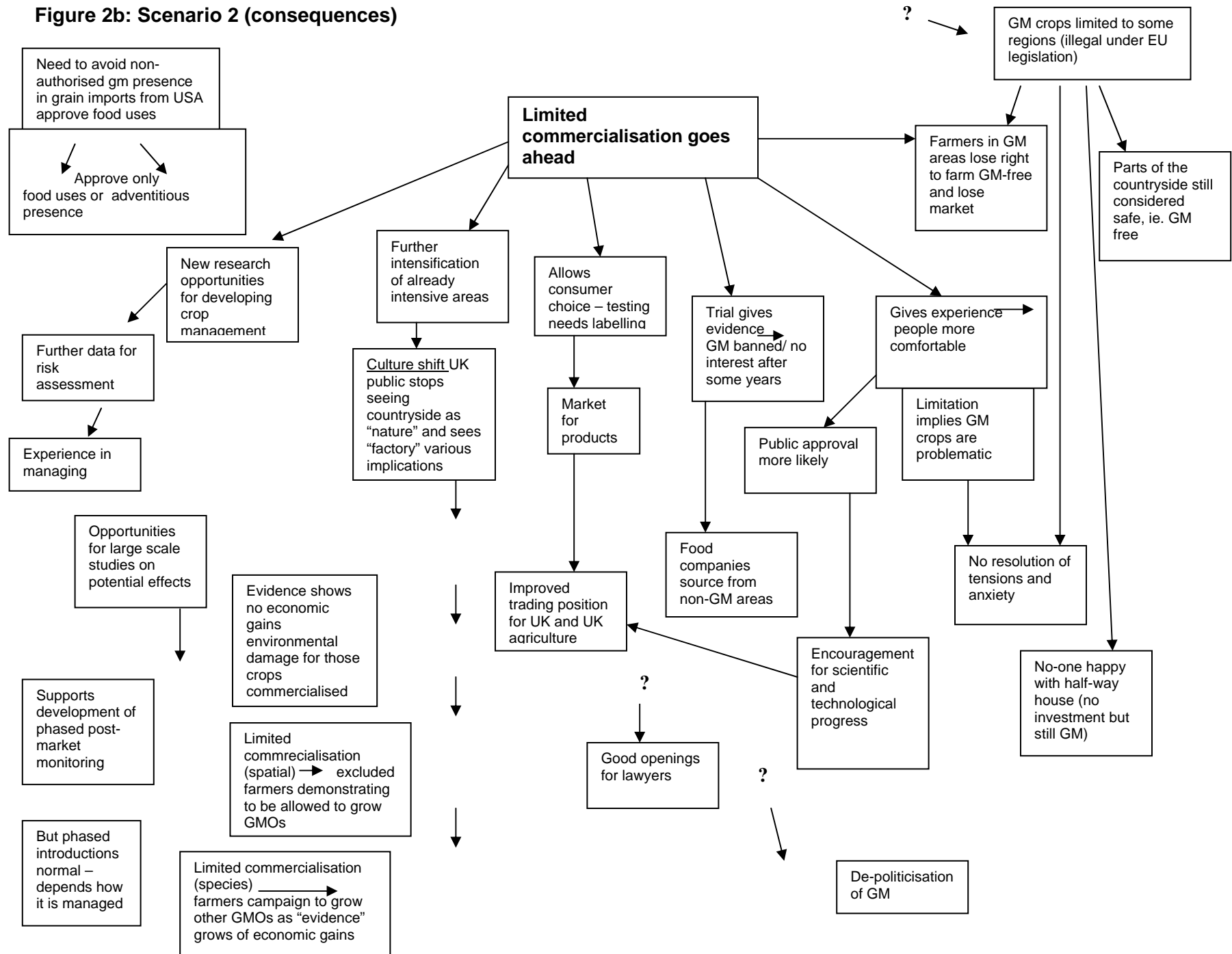


Figure 3a: Scenario 3 Commercialisation goes ahead (causes)

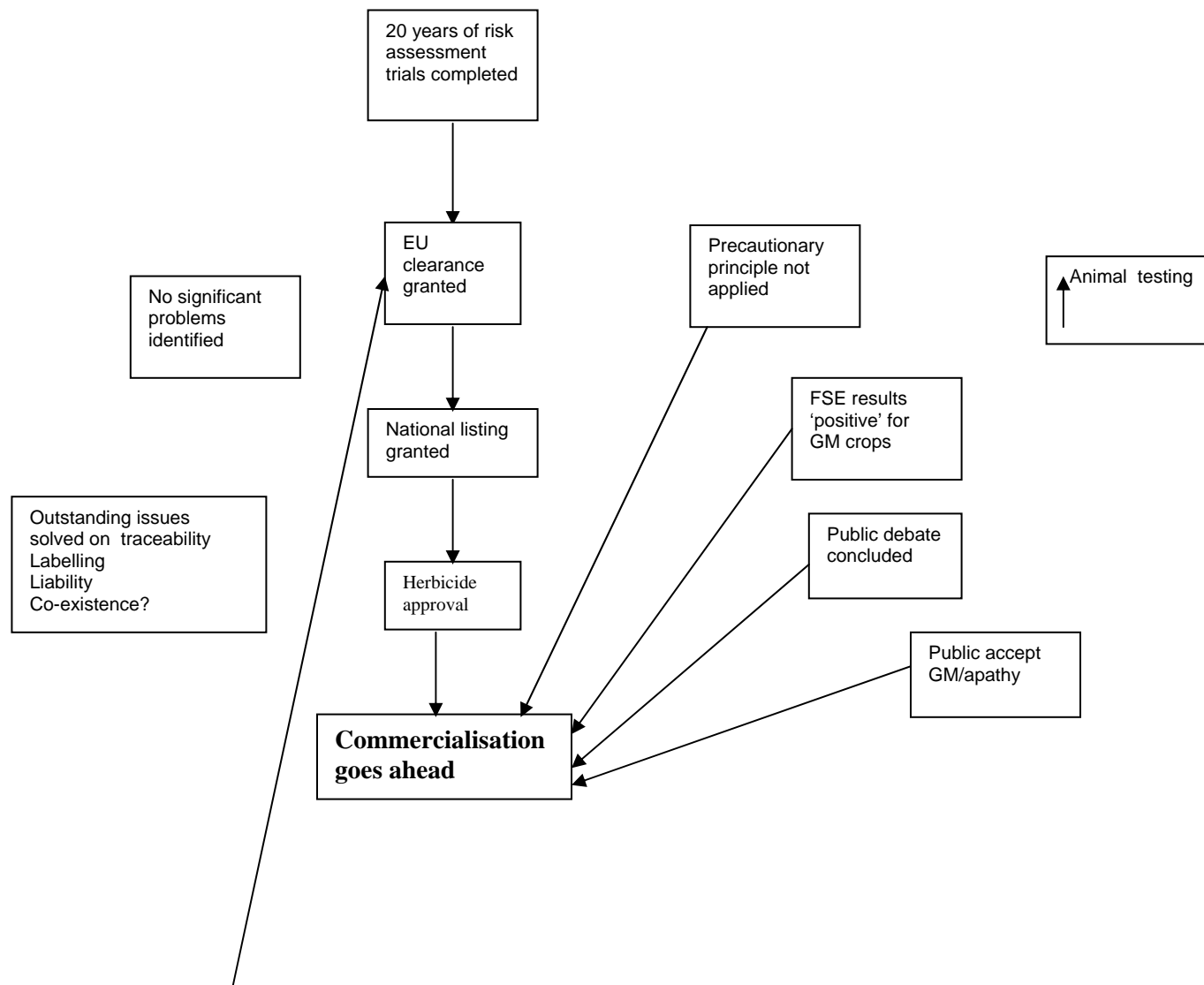
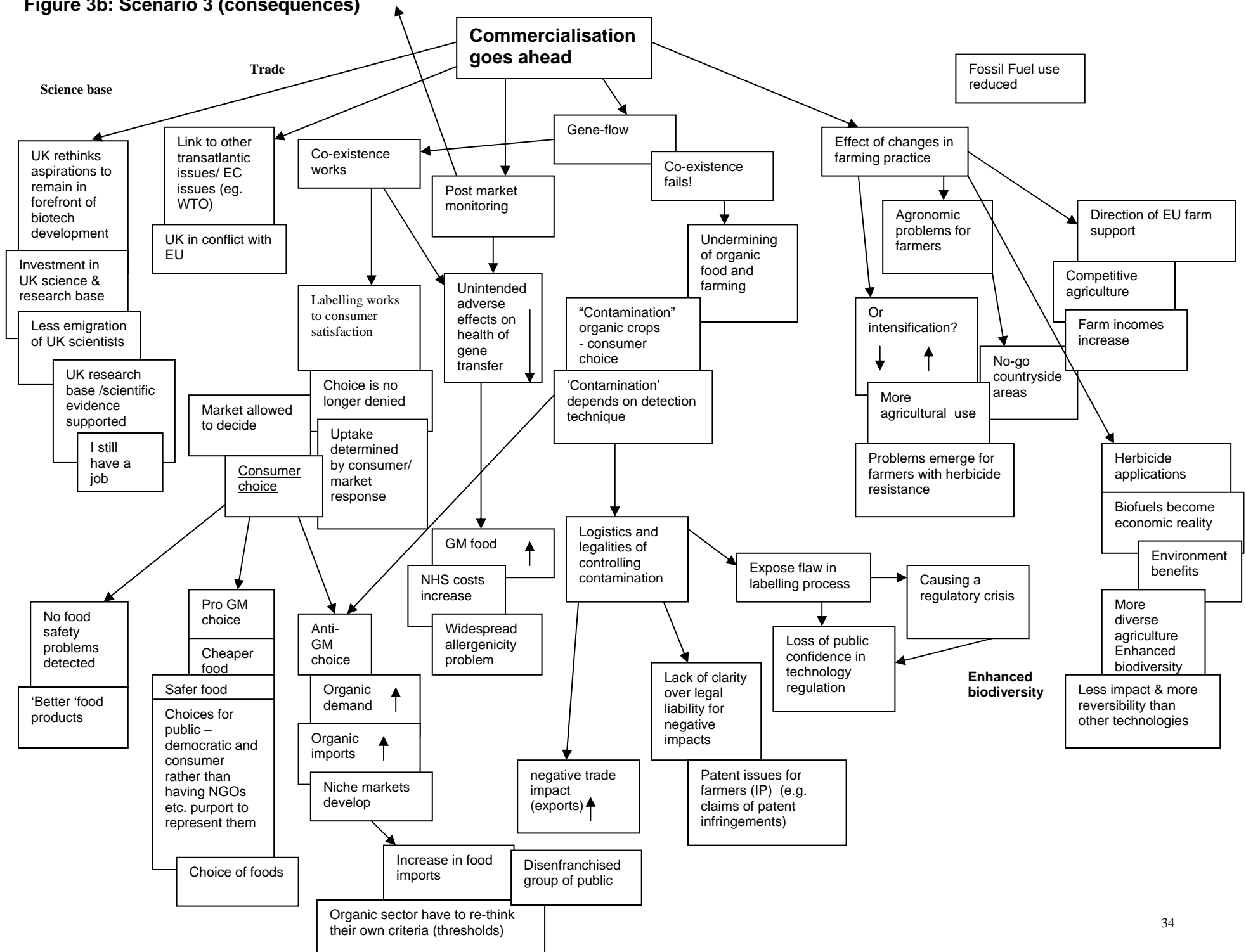


Figure 3b: Scenario 3 (consequences)



Appendix 8: Initial feedback sheet to participants

'GM FUTURES? Scenarios for GM Crops in the UK' **Brief observations**

THE EVENT: 'GM FUTURES? Scenarios for GM Crops in the UK' was a scenario building workshop held on 5th February 2003 in London. The workshop was organised by the Open University as part of a research project, 'Precautionary Expertise for GM Crops' (PEG), funded by the European Commission. Parallel workshops are being held by project partners in several other EU member states.

OUTCOMES: Policy-relevant observations on decision making for GM crops in the UK.

OUTLINE OF THE DAY: A range of stakeholders attended the workshop, including members of ACRE, the AEBC, industry, Government, and academia. The event was managed by a professional facilitator and conducted under Chatham House rules. Following introductory talks the participants were divided into three groups and asked to consider the "possible causes and consequences" of three policy scenarios for GM crops: (1) commercialisation is postponed further; (2) limited commercialisation goes ahead; (3) commercialisation goes ahead. Each group then "mapped" such causes and consequences for one scenario. Professor Alan Gray, Chair of ACRE, closed the event with reflections on the day.

Policy-relevant observations can be drawn from the scenario maps created and the process of creating them.

OBSERVATIONS FROM THE SCENARIO MAPS: Some observations are specific to particular scenarios and others are generic.

SCENARIO 1 Commercialisation is postponed further: Participants identified fewer causes of this scenario than consequences. This is interesting, given the pressures that exist for partial or full commercialisation. This may reflect the fact that postponement is increasingly the status quo, and it is often easier to maintain the status quo. However, participants did identify a large number of diverse and often problematic consequences. Some consequences were contradictory, that is, participants thought both were possible, such as confidence in the regulatory system amongst members of the public could go up *or* down as a result of postponing commercialisation.

SCENARIO 2 Limited commercialisation goes ahead: Participants grouped the causes and consequences of this scenario according to themes - social, legal, political and commercial. Concerning causes, one of the most interesting observations was that limited commercialisation might occur because it is an attractive political compromise. It would present the opportunity of accommodating all sides in the controversy. However, the discussion of consequences established that this might in practice leave almost all the existing problems unresolved whilst at the same time adding new ones.

SCENARIO 3 Commercialisation goes ahead: As with scenario 1, participants identified fewer causes than consequences. Similarly, there were many examples of contradictions being involved. For example, a cause such as "the government ignores science" or the "government accepts science" could each result in commercialisation. This probably reflects different value positions on GM crop issues. There was also considerable disagreement on the consequences of this scenario. One observation was that, consequences could be determined by the success or failure of a small number of regulatory mechanisms e.g. segregation and labelling. However, views differed on what

outcome would count as “success” or “failure”. For example, if gene flow resulted in contamination, this could be seen as a failure of the regulatory system even if threshold values were not breached.

Common issues: Two important general observations can be made. (1) Participants tended to classify causes and consequences of scenarios according to themes e.g. regulatory issues, market issues, social issues. Such themes are useful but during the mapping exercise they meant that chains of causality tended to be identified within (rather than across) themes. This structure made it difficult to capture the complexity of the real world. At the same time, it may reflect the way in which the thinking of people involved in the policy process can be restricted. (2) Participants often offered causes and consequences that were informed by an idealized model of the situation. One example, from Scenario 3, was the tendency to invoke perfect regulation. Regulations that operated perfectly made specific negative consequences of commercialisation “impossible”. Idealized representations of scientific research and economically rational businesses were also often invoked.

OBSERVATIONS ON THE PROCESS: Despite the short amount of time devoted to the scenario exercise, a rich variety of causes and consequences were identified and mapped. However, each group functioned differently. For example, one group discussed the causes and consequences and appointed a scribe to write them down, in the other groups, individuals or sub-groups wrote their own phrases. The causes and consequences could not therefore be read as a group or consensus view. Although generally the exercise enabled people to express their views, there were cases of participants policing the ideas. In this way processes (or institutions) can become blind to possible/plausible causes or outcomes of decisions.

The main type of scenario that the groups were allocated may have influenced how the group functioned. For example, the scenario “commercialisation is further postponed” may have been easier to consider because it involved a continuation of the present situation. The causes were therefore taken for granted, although the consequences provoked much discussion. The second scenario was more difficult because participants had different ideas about the meaning of the word “limited”. They discussed options which included limitation by crop, trait, product use and geographical area.

Follow-up

A draft report will be circulated for comment in March. The final version will be made publicly available as an output from the PEG research project.

Along with the other national workshops, observations from this one will inform the design of an EU-level workshop in Brussels.

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